

REMARKS

By this amendment, Applicants have amended the claims to more clearly define their invention. In particular, claim 5 has been amended to recite that the perimeters of the pattern member and the base member are coextensive. This amendment is supported by, e.g., Figures 8 and 9.

Claims 7-11 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Applicants again traverse this rejection and request reconsideration thereof.

As recognized by the Examiner, claims 7-11 are original claims. As such, claims 7-11 serve as their own written description. While it is urged in the Office Action that there is no indication that Applicants' had possession of the invention of claim 5 in combination with the subject matter of claims 7-11, i.e., an invention in which the curved based member and mold with a curved surface was used in combination with the features recited in claims 7-11, it is submitted the Office Action improperly refers only to the specific examples of the present invention and not to other portions of the specification which support the combination of the claimed feature. For example, it is submitted the disclosure at page 3, line 9 to page 4, line 25 supports the various preferred features being used together.

For example, it is disclosed at page 3, lines 9-12 that:

The invention also provides a nanoprint mold for forming a fine structure on a substrate using a press machine, wherein a portion of a periphery portion of said mold on the side where the concave-convex pattern is formed is inclined such that a center portion of the substrate has a large thickness.

Continuing at page 3, line 17 to page 4, line 5, it is further disclosed that:

The invention also provides a nanoprint mold for forming a fine structure on a substrate using a press machine, wherein the mold is flexible....

Preferably, the mold is secured to a supporter via an elastomer....

Preferably, the supporter comprises a rectangular, square, circular, or elliptical frame structure....

The invention also provides a nanoprint mold for forming a fine structure on a substrate using a press machine, wherein said mold is provided with an elastomer at an edge of the side of said mold on which the concave-convex pattern is formed, said elastomer facilitating the release of said mold from said substrate.

Clearly, the specification contemplates these features being used together.

Accordingly, it is submitted claims 7-11 are supported by the written description.

Claims 3-5, 7-10, 25 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0009673 A1 to Sreenivasan et al. in view of U.S. Patent No. 2,201,302 to Rowe. Applicants traverse this rejection and request reconsideration thereof, at least insofar as it applies to the claims as presently amended.

The present invention relates to a nanoprint mold for deforming a flat resin substrate or a flat resin film on a substrate to form a fine structure on a substrate with use of a press machine. See, e.g., Figures 9a-9c of the subject application. According to the present invention and as shown by way of example only in Figures 5a, 5b, 6a, 6, 7a-7c, 8, 9a-9c and 10, the mold includes a laminated structure including a base member having a curved surface and a pattern member having a concave-convex pattern. As shown, e.g., in Figs. 8 and 9, the pattern member is bonded to the base member, and perimeters of the pattern member and the base member are coextensive. The mold is provided with a curved surface on the side thereof on which the concave-convex pattern is formed. The mold is also provided with a deep groove (deeper than the concave portions of the concave-convex pattern) at a center portion of the mold between extending to an open to the periphery portions. By virtue of the curved surface

and the deep groove, the mold is easily released from the flat resin substrate or flat resin film after forming the fine structure. With the use of the deep groove, air is introduced to the deep groove at a center of the substrate to provide a release-start point resulting in the ease of releasing the substrate from the mold after transfer printing.

The Sreenivasan et al. publication discloses a lithography process for creating patterns in an activating light curable liquid using electric fields followed by curing of the activating light curable liquid. As noted by the Examiner (see numbered section 6 of the Office Action), while the Sreenivasan et al. publication discloses a lithography process, the imprints are preformed on flat articles. The Sreenivasan et al. publication does not disclose a mold provided with a curved surface on the side thereof on which the concave-convex pattern is formed.

The Rowe patent discloses a rubber stamp 11 having a printing surface 12, a thicker central body 13, a resilient pad 24, and a backing element 19. The stamp holder 15 has a body 16 and a threaded extension 17 carrying a nut 18. The rubber stamp 11, the resilient pad 24 and the backing element 19 are held by the flange 27, which clamps over the flange 14 of stamp 11. The outer surface of the backing member 19 is shown as spherically convex, because it is particularly adapted for use with a holder 15 for printing on spherically concave surfaces. The spherical convex surface of backing member 19 of Rowe is for printing on spherically concave surface of glass lamp bulb, but is not for facilitating the release of a rubber stamp from the glass bulb.

For the reasons set forth in the remarks accompanying the Amendment and Submission Under 37 CFR §1.114 filed August 5, 2009, one of ordinary skill in the art would not have recognized the techniques or stamp of Rowe as applicable to the process or template of Sreenivasan et al. Accordingly, it is submitted there would not

have been any apparent for one ordinary skill in the art to have combined the disparate teachings of Sreenivasan et al. and Rowe.

Moreover, even assuming, arguendo, one of ordinary skill in the art would have combined the teachings of Sreenivasan et al. and Rowe, even the combined teachings would not have rendered obvious the presently claimed invention.

In Rowe, the object to be printed, i.e., the spherically concave surface of a glass lamp bulb, is not made of deformable material such as resin film or resin substrate. Thus, in Rowe, the spherical convex surface of the backing member 19 is for printing on a spherically concave surface of a glass lamp bulb. That is, the curvature of the surface of the backing member 19 is designed to match the curvature of the surface of the bulb. The rubber stamp 11 is pressed to the surface of the glass bulb but is not pressed into the surface, i.e., it is not for deforming a flat resin substrate or a flat resin film on a substrate, as is the nanoprint mold of the present invention. Thus, the Rowe patent fails to provide any teachings with respect to release of a nanoprint mold from a flat resin substrate or a flat resin film on a substrate. Thus, there are no peeling forces acting on the stamp of Rowe.

On the other hand, according to the present invention, the mold comprises a laminated structure, the laminated structure including a base member having a curved surface and a pattern member having a concave-convex pattern, the pattern member being bonded on the base member, the perimeters of the pattern member and the base member being coextensive. Since the pattern member and the base member are coextensive, the concave-convex pattern can overspread the curved surface of the mold.

According to the present invention, the mold is provided with a curved surface on the side thereof on which the concave-convex pattern is formed, and the side of said

mold on which the concave-convex pattern is provided with a deep groove, deeper than concave portions of the concave-convex pattern, at a center portion of the mold between periphery portions. Since the mold is provided with a curved surface and a deep groove, it allows air to be introduced into the deep groove and provide a release start point for releasing the mold from the flat resin substrate or flat resin film during use of the mold.

Even if the concave-convex pattern can overspread the curved surface of the mold, the pattern member can be prevented from being peeled from the base member in a releasing step due to the deep groove. Such is not taught by Rowe.

In addition, in the stamp device of Rowe, the object to be printed, which is glass lamp bulb, has a spherical convex surface and is not made of deformable material such as flat resin film or flat resin substrate. In Rowe, a relatively large force is not necessary to release the rubber stamp proper 11 from the glass lamp bulb, and therefore, no peeling force acts on the rubber stamp proper 11. Rowe fails to teach the pattern member may be peeled from the base member in a releasing step.

Rowe also fails to teach the pattern member being bonded on the base member, and the perimeters of the pattern member and the base member being coextensive. Rowe fails to teach that the concave-convex pattern can be overspread the curved surface of the mold.

On page 5 of the office action, it is contended that the Rowe stamp is inherently suitable for pressing against a flat resin film. The Rowe stamp is a general stamp for use of printing or etching symbols or numerals with ink or etching liquid on glass and is not a stamp for use of nano-printing. The technical field to which the Rowe stamp belongs is different from that to which the nano-printing of the present invention does.

Accordingly, there is no evidence that the Rowe stamp is not inherently suitable for nano-printing against a flat resin film.

Moreover, the teachings of Rowe suggest using a curved backing member for printing on a curved surface, i.e., matching the curvature of the stamp to the surface being stamped. Since the Sreenivasan et al. publication creates patterns in a flat surface, the teachings of Rowe would teach away from the present invention, i.e. would teach matching the template to the surface. Since the surface to be imprinted in Sreenivasan et al. is flat, it is submitted the teachings of Rowe would suggest to one of ordinary skill in the art to use a flat template. Thus, the Rowe patent teaches away from the presently claimed invention in which a curved surface is used to form a fine structure on a flat resin substrate or a flat resin film.

For the foregoing reasons, the presently claimed invention is patentable over the proposed combination of Sreenivasan et al. and Rowe.

Claims 6 and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sreenivasan et al. and Rowe and further in view of U.S. Patent Application Publication No. 2002/0132482 A1 to Chou. Applicants traverse this rejection and request reconsideration thereof.

The Examiner has cited the Chou publication as allegedly teaching several means to soften or cure a film such as UV and heating. However, clearly nothing in Chou remedies any of the basic deficiencies noted above with respect to Sreenivasan et al. and Rowe. Accordingly, claims 6 and 11 are patentable at least for the reasons noted above.

Claims 27 and 28 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sreenivasan et al. and Rowe and further in view of JP-9-511710. Applicants traverse this rejection and request reconsideration thereof.

JP '710 has been cited by the Examiner as allegedly teaching bonding a base member and a pattern with PDMS, which functions as an adhesive and helps to facilitate contact with a coarse or curved surface. However, clearly nothing in JP '710 would have remedy the basic deficiencies noted above with respect to Sreenivasan et al. and Rowe. Accordingly, claims 27 and 28 are patentable over the proposed combination of documents, at least for the reasons noted above.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

Please charge any shortage in the fees due in connection with the filing of this paper, including excess claim fees, to Deposit Account No. 01-2135 (1021.43672X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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